

REMARKS

Reconsideration and withdrawal of the rejections to the claims set forth in the Office Action of July 15, 2003 are respectfully requested in view of the following remarks.

Status of the Claims

Claims 1-17 are currently pending.

Claims 1-17 stand rejected.

Claim Rejections - 35 U.S.C. § 103(a)

The Examiner has rejected claims 1-17 under 35 U.S.C. § 103(a) as being unpatentable over the combination of U.S. Patent No. 5,953,467 to Madsen and U.S. Patent No. 5,689,597 to Besse. Reconsideration and withdrawal of the rejection are respectfully requested based on the following remarks.

As defined in claim 1, the claimed invention concerns a self-imaging multimode interference based coupler. The coupler includes (1) at least one input access waveguide for inputting an input optical signal into a first end of the multimode interference based coupler, (2) at least one output access waveguide for outputting images of the input optical signal from a second end of the multimode interference based coupler, and (3) a multimode region coupling the one or more input waveguides to the one or more output waveguides through which the input optical signal propagates from the first end to the second end along a propagation axis and is reimaged at the one or more output access waveguides. The multimode region includes (1) two opposing sidewalls which define a width of the coupler at each point along the propagation axis, (2) at least one of the sidewalls of the multimode region has a non-linear taper inward toward the opposing sidewall such that the coupler has an average width along the propagation axis that is

less than the average width had the sidewalls both been straight lines, and (3) the sidewalls are smoothly continuous with continuous derivatives along the propagation axis.

The Madsen reference is directed to a switchable optical filter. In contrast to the instant application, the Madsen reference in Fig. 1 does not depict a multimode region. Applicant respectfully submits that the Examiner's interpretation of Fig. 1 is incorrect and requests reconsideration in light of the following remarks. The actual region in Fig. 1 in which the waveguides couple (near K1) is so small that the device may appear to be tapered; however, that is not the case, as Fig. 1 is simply a schematic. (See the Madsen reference, col. 2, lines 40-42) ("...FIG. 1 schematically illustrates..."). The S-bends in the device are a standard waveguide layout used to bring waveguides close to one another, but they in no way imply additional functionality of the device. These common s-bends thus are not a "nonlinear taper inward" of a multimode region, as is required by claim 1 of the instant application in combination with the other elements recited therein. The black lines in Fig. 1 represent single mode fibers or single mode isolated waveguides, rather than Multi-Mode Interference (MMI) couplers as the Examiner suggests.

Moreover, the Multi-Mode Interference coupler in Fig. 7 of the Madsen reference has straight walls. The characteristic formula for MMI's given in the Madsen reference at col. 5, lines 26-30 applies for straight-walled MMI's, not the instant application. Thus, the Madsen reference fails to depict a multimode region with curved sidewalls. Furthermore, bending a directional coupler will potentially induce an unwanted wavelength response for the filter in the Madsen reference. The Madsen reference thus, does not teach, disclose or suggest, "at least one of the sidewalls of the multimode region has a non-linear taper inward toward the opposing sidewall such that the coupler has an average width along the propagation axis that is less than

the average width had the sidewalls both been straight lines,” to a person of ordinary skill in the art or motivate such a person to make such an invention. In view of the complete absence of this claim limitation in the Madsen reference, and thus the fact that the Madsen reference does not disclose each and every element of either claim 1, either expressly or inherently, claim 1 is patentable over the Madsen reference.

The Besse reference has been cited only for the teaching of “sidewalls ...with an average width along the propagation axis that is less than the average width had the sidewalls both been straight lines.” (Office Action, page 3) The Besse reference, however, does not disclose or suggest any of the aforementioned features of claim 1 missing from the Besse reference, and has not been so cited. Thus, claim 1 is not rendered obvious by the combination of the Madsen reference with the Besse reference.

Claims 2-12 which are dependent on claim 1 are thus also patentable over the combination of the Madsen and the Besse references.

Claim 13 is patentable over the combination of the Madsen and Besse references for at least the reasons that claim 1 is patentable.

Claims 14-17 which are dependent on claim 13 are thus also patentable over the combination of the Madsen and the Besse references.

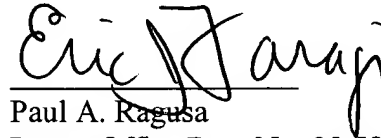
Conclusion

In view of the foregoing, the application is now believed to be in condition for formal allowance. Prompt and favorable action is respectfully requested. A check in payment of the extension fee is enclosed. Applicant does not believe that any additional fee is required in connection with the submission of this document. However, should any additional fee be

required, or if any overpayment has been made, the Commissioner is hereby authorized to charge any fees, or credit or any overpayments made, to Deposit Account 02-4377.

Respectfully submitted,

BAKER BOTTS, L.L.P.

A handwritten signature in black ink, appearing to read "Eric J. Faragi", is written over a horizontal line.

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